

Name:

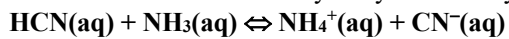
Date:

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Show all work for each question, box your final answer

[1] Calculate the equilibrium constant,  $K_{\text{neut}}$  for the neutralization of hydrocyanic acid by ammonia: **0.72**



$K_a$  for hydrocyanic acid =  $4.0 \times 10^{-10}$  at  $25^\circ\text{C}$ ,  $K_b$  for ammonia =  $1.8 \times 10^{-5}$  at  $25^\circ\text{C}$

[2] If exactly 50 mL of a 0.050M solution of hydrochloric acid is added to exactly 50 mL of 0.050M ammonia, what is the pH of the resulting solution? **5.43**

[5a] What is the pH of 100 mL of pure water at  $25^\circ\text{C}$ ? **7.0**

[b] What would the pH of this 100 mL water sample be if 0.10 mL of 12M HCl was added to it? (Assume the volume doesn't change). **1.92**

[c] Calculate the pH of a buffer solution composed of 0.20M ammonia and 0.20M ammonium chloride. 9.26

[d] Calculate the pH of 100 mL of this buffer solution if 0.10mL of 12M hydrochloric acid is added to it. (Assume the volume doesn't change). 1.8E<sup>9</sup>

[6] A solution contains  $\text{KH}_2\text{PO}_4$  and  $\text{K}_2\text{HPO}_4$  and has a pH of 7.10. What is the mole ratio of  $\text{K}_2\text{HPO}_4$  to  $\text{KH}_2\text{PO}_4$ ? 0.776:1